

Australian Patent

98 91344

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ABSTRACT

Parsons

A gaming machine includes:-

a cabinet, a bill acceptor; and a main cage disposed around the bill acceptor, the main cage defining sides and a floor.

A cash box is provided for receiving notes paid into the machine via the bill acceptor. The cash box is mounted on rails or the like which extend from inside the cage close to or adjacent the floor of the cage and towards the open upper surface of the main cage such that the cash box is movable from a position inside the main cage, along the rails, to a position where the cash box is located at or above the upper surface of the main cage to allow easy access to the cash box.

A spring loading means is provided for assisting in raising the cash box from inside the cage. The spring loading device includes:-

a drum housing a coil spring, a spring adjuster which defines a grip means and an integral tube means which extends into the drum and to which an innermost end of the spring is fixed, an internal flange being defined in the tube, one side of which flange defines a series of sprag type clutch teeth, and a post inserted inside the bore of the tube. The post defines a series of spray type clutch teeth adapted to mate with the clutch teeth of the flange, and is secured to the wall of the cage. Rotation of the drum relative to the post stores energy in the spring. The drum is anchored to the cash box by a cable: tension in the cable can be adjusted by means of turning the spring adjuster to assist in raising the cash box. When the cash box is pushed into the main cage, energy is stored in the spring loaded device which can be used to automatically raise the cash box when the cage is opened..

AUSTRALIA

Patents Act 1990

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ORIGINAL



COMPLETE SPECIFICATION STANDARD PATENT

Invention Title:

Spring loading means

The following statement is a full description of this invention including the best method of performing it known to us:-

Field of the Invention

This invention relates to a spring loading means. In particular, it relates to a spring loading means for use with a bill acceptor cage for a gaming machine.

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Background of the Invention

Typically, slot machines, also known as fruit machines or poker machines and referred to in this specification by the generic term "gaming machines" are mounted in a cabinet or enclosure. Until recently, most gaming machines have been credited with plays by the insertion of coins into the gaming machine. A cash box is housed in the cabinet into which coins which are retained by the operator of the machine drop, for regular clearing by the operator. Such cash boxes become quite heavy when full of coins and it is time consuming for the operator to periodically empty the cash box. Thus recently, gaming machines began to accept other forms of credit, either by remote crediting from a cash control terminal or by means of the gaming machines including a bill acceptor so the machine can accept bills/notes as well as coins.

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For security reasons it is necessary that the bill acceptor is securely retained in the gaming machine cabinet in a location in which it is not easily tampered with. For this reason bill acceptors are generally located within cages.

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However, there is a clear dichotomy between keeping the bill acceptors secure within a cage to prevent unauthorised access while at the same time allowing easy authorised access to the bill acceptor by the operator of the machine.

The present invention addresses that problem.

Summary of the Invention

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Thus in a first aspect of the present invention there is provided a spring loading device for use in a gaming machine including:-
a drum housing a coil spring;

a spring adjuster which defines a grip means and an integral tube means which extends into the drum and to which an innermost end of the spring is fixed, an internal flange being defined in the tube, one side of which flange defines a series of sprag type clutch teeth; and

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5 a post inserted inside the bore of the tube, the post defining a series of spray type clutch teeth adapted to mate with the clutch teeth of the flange, the post being securable to a wall or the like such that rotation of the drum relative to the post stores energy in the spring and wherein when the drum is anchored to an object by a cable or the like tension in the cable can be adjusted by means of turning the spring adjuster.

The spring may be a steel coil spring.

In a related embodiment there is provided a gaming machine including:-

- 10 a cabinet housing a gaming machine control unit for receiving inputs relating to the playing of a game;
- 15 a bill acceptor for receiving and verifying monetary bills such as dollar bills and the like;
- 20 a main cage disposed around the bill acceptor, the main cage defining sides and a floor; and
- 25 a cash box for receiving notes paid into the machine via the bill acceptor, the cash box being mounted on rails or the like which extend from inside the cage close to or adjacent the floor of the cage and towards the open upper surface of the main cage such that the cash box is movable from a position inside the main cage, along the rails, to a position where the cash box is located at or above the upper surface of the main cage to allow easy access to the cash box and wherein a spring loading means preferably as described in the first aspect of the present invention is provided to assist in raising the cash box whereby when the cash box is pushed into the main cage, energy is stored in the spring loaded device which can be used to automatically raise the cash box when desired.

Brief Description of the Drawings

30 The invention will now be described by way of example only and with reference to the accompany drawings in which:

Figure 1A is a cross-section through a spring loading device for a gaming machine embodying the present invention;

Figure 1B is a schematic sectional plan view of the device of Figure 1A;

35 Figure 2A is an end view of a drum of the spring loading device shown in Figure 1;

Figure 2B is a section on line IIB-IIB of Figure 2A;
Figure 2C is an enlarged view of part of Figure 2A;
Figure 3A is an end view of a spring adjuster which forms part of the
spring loading device shown in Figure 1;

5 Figure 3B is a section on line IIIB-IIIB of Figure 3A;
Figure 3C is a view on arrow A shown in Figure 3A; \
Figure 3D is a view on arrow B shown in Figure 3B;
Figure 4A is an end view of a post of the spring loading device shown
in Figure 1;

10 Figure 4B is a side view of the post of figure 4B;
Figure 4C is an end view of the post from the opposite end to that
shown in Figure 4A;
Figure 4D is a plan view of a base locator;
Figure 4E is a section on line IVE - IVE of Figure 4D;

15 Figure 5 is an exploded view of a bill acceptor cage and components
for use in a gaming machine;
Figure 6 is a schematic end view of the bill acceptor cage of Figure 5;
Figure 7 is a perspective view of a gaming machine incorporating the
bill acceptor of Figure 5; and

20 Referring to Figure 1A, a spring loading device is shown generally at
10. The spring loading device is generally rotationally symmetrical about its
central axis 12. The spring loading device is mounted to a wall 14 of a cage
of a bill acceptor main cage by means of a bolt and nuts as is described in
more detail below.

25 The components of the spring loading device include a housing or
drum 20, an end plate or a spring adjuster 50, a post 80, a steel coil spring
100, and a base locator 130.

30 The drum 20 is shown in Figure 1 and Figures 2A to 2C. The outer
wall 22 of the drum is generally cylindrical having an annular cross-section
which tapers slightly from a first end 24 at which an end flange 26 is defined,
to its second or opposite end 28. An internal flange 30 is integrally formed
with the wall 22 partly closes the bore of the drum close to the second end
28. A cylindrical aperture 32 is defined in the centre of the plate 30. The
plate is spaced approximately 8 mm from the second end of the cylinder so
35 as to define a circular perimeter wall portion 22A on the opposite side of the
plate to the first end 24.

There is a further upstanding circular wall portion 34 which extends around the outside of the hole 32 which is approximately 3 mm taller than the wall portion 22A so that it projects slightly beyond the wall portion 22A.

5 A hook 36 best seen in Figure 2C is defined on the outside of the drum approximately midway between the first and second ends.

The interior of the drum defines a series of eight inwardly projecting flat ribs 38 equally spaced apart around the interior of the drum which extend from the plate 30 to the end 24.

Figures 3A to 3D show the spring adjuster or end cover 50. The first end 50A if the spring adjuster 50 comprises a circular plate 52. The edge of the plate is knurled to provide grips or knobs 53 for turning the adjuster. An integral perimeter wall 54 projects from one side 50A of the plate towards the second end 50B of the spring adjuster. A central circular aperture 56 is defined in the plate and an integrally formed, generally annular, tube 58 projects from same side of the plate as the wall 54. The tube has a generally uniform annular cross-section defining a bore 57 of constant diameter, apart from an internal flange 60 which is defined towards the end of the tube distal from the plate 52. On one face of the flange, being the side which faces the plate 52, there are eight clutch teeth 62 having a saw tooth configuration best seen in Figure 3B. The saw teeth are arranged in a circular path around the central bore 57 of the tube 58. The opposite face 63 of the flange is smooth.

20 As seen in Figure 3B, 3C and 3D a slit or groove 64 extends along the outside of the tube 58 running parallel to the longitudinal axis of the tube, from the second end 58B of the tube towards the plate 50 approximately as far as the free end of the wall 54.

Figures 4A to 4C show the post 80, which has a first end 80A and a second end 80B. The post comprises a first portion 82 the external diameter of which is marginally smaller than the diameter of the bore 57 of the spring adjuster. Two thirds of the way along the post 80 there is a step 84 where the external diameter of the post reduces by approximately one third to define a narrower diameter portion 86. The annular face of the step 84 defines a series of eight clutch teeth having a saw tooth configuration, best shown in Figures 4B and 4C. The saw teeth are configured to mate with the corresponding saw teeth 62 defined by the flange 60 in the bore 57, in a sprag clutch type arrangement.

5 A cylindrical bore 88 extends through the narrow diameter portion of the post from the second end 80B past the step and part of the way into the first larger diameter portion 82 of the post. The second portion 90 of the bore of the post best seen in Figure 4A, which extends to the first end 80A is generally hexagonal in cross-section.

10 Figures 4D and 4E show a base locator 130 which comprises a generally circular base 132 having an upstanding external flange 134 and a series of large diameter holes 136, 138, 140 and smaller diameter holes 142 through the base. A hole 136 is located in the centre of the base and includes a circular rebate 136A adapted to receive end 80B of the post.

15 Figure 1 shows the components of the spring loading means assembled and fixed to the wall of a bill acceptor cage. As can be seen, a thick steel coil or power spring having eleven turns is installed in the interior of the drum. The inner end 100A of the spring inserted in the longitudinal slit 64 in the spring adjustor whose tube 58 is inserted into the drum 20 through the aperture 32, as illustrated in Figure 1. The outer most end of the spring locates adjacent one of the ribs 38.

20 The post 80 fits inside the bore 54 of the table.

25 When the spring loading device is installed in a cage the device is assembled as shown in Figure 1 with the distal end of the post 80 fixed against one side of the cage and held there by a bolt 110 having a hexagonal head 112 a flat 113 machined on the threaded end of the bolt so that when and secured with nuts 114, 116, the bolt is not able to rotate relative to the wall 14 and the post 80 is thus fixed. A spring 120 is disposed between the wall of the cage 14 and face 64 of the flange 60 which biases the teeth of the post to engage with the clutch teeth 60 of the bore 57.

30 Figures 5 and 6 show the arrangement of the spring loading means in a main cage 209 in more detail. The cage 209 has two side walls, two end walls, and a generally rectangular floor but no top. Close to the top of each of the two side walls there are curved slot 210A, 210B respectively, which extend in a generally horizontal direction. As can be seen from Figure 6 the spring loading device is attached inside the main cage to one of the longer side walls below the slot 210B.

35 The bill acceptor assembly includes the bill acceptor per se 202 which checks notes paid into the machine accepts the cash if the note is successfully verified and a cash box 203 into which the accepted notes or

bills are transferred and stored. The cash box 203 is fixed inside a further cage 206. The bill acceptor 202 is fixed to a lid assembly generally indicated at 204.

The cage 206 is mounted on a rail 207 which is mounted on two further, telescoping, rails 207A, 207B, which can move up and down to raise or lower the bill acceptor, into or out of the main cage 209. The lid assembly 204 moves to allow the cage 206 to be raised from the main cage 209. Rollers 222 project from each side of the lower part of the lid assembly 204. These are located in the slots 210A, B defined in the sides of the main cage 209. As seen in figure 5, generally vertically extending curved slots 208A, 208B are defined in each side of the lid assembly. Opposite ends of a rod 210 are located on the slots 208A, 208B and also extend into the slot 210A, 210B which surrounds the lower parts of the sides of the lid 204. Thus the lid assembly 204 may slide back and forwards along the slots 210A, B so that when the lid is pushed backwards, the cage 206 can rise from out of the main cage. When the lid closes the main cage 209 the rod 210 is located at the upper end of the slots 208A, B and the lid cover or plate 204A is oriented at a slight angle to the horizontal. However when the main cage assembly is unlocked (226) and the lid assembly pushed backwards, the rod 210 as well as moving along the slots 210A, B, also moves to the lower end of slots 208A, 208B thus changing the angle of orientation of the lid assembly.

A 1mm diameter stranded cable is attached to the hook 36 on the drum. The cable is wrapped one round the drum and passes over and a bore a pulley disposed above the spring loaded device. The end of the cable is fixed to the base of the bill acceptor cage.

Tension in the cable (pre-tensioning) can be adjusted by turning the cover 50 clockwise in the direction of arrow A (see Figure 3B) (which is anticlockwise in Figure 1B). When turned clockwise the post and drum act as a sprag clutch with the angled faces of the teeth moving smoothly over each other with counter clockwise rotation prevented by the vertical faces of the teeth. Tension can be released by pushing the cover 50 towards the base 30 and moving the drum 20 thus disengaging the teeth.

Movement of the bill acceptor cage into the main cage stores energy in the spring via the cable pulley of arrangement by turning the drum 20 of the spring biasing means storing energy in the spring.

The spring loading device/bill acceptor assembly is particularly suited for use with low level gaming machines such as are shown in Figures 7 and 8, however could have applications in other devices.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A spring loading device including:-
 - a drum housing a coil spring;
 - a spring adjuster which defines a grip means and an integral tube means which extends into the drum and to which a innermost end of the spring is fixed, an internal flange being defined in the tube, one side of which flange defines a series of sprag type clutch teeth; and
 - a post inserted inside the bore of the tube, the post defining a series of spray type clutch teeth adapted to mate with the clutch teeth of the flange, the post being securable to a fixed means such as a wall or the like and whereby rotation of the drum relative to the post stores energy in the spring and wherein when the drum is anchored to an object by a cable or the like tension in the cable can be adjusted by means of turning the spring adjuster.
2. A spring loading device as claimed in claim 1 wherein the spring is a steel coil spring.
3. A gaming machine including:-
 - a cabinet housing a gaming machine control unit for receiving inputs relating to the playing of a game;
 - a bill acceptor for receiving and verifying monetary bills such as dollar bills and the like;
 - a main cage disposed around the bill acceptor, the main cage defining sides and a floor;
 - a cash box for receiving notes paid into the machine via the bill acceptor, the cash box being mounted on rails or the like which extend from inside the cage towards the open upper surface of the main cage such that the cash box is movable from a position inside the main cage, along the rails, to a position where the cash box is located at or above the upper surface of the main cage to allow easy access to the cash box; and
 - a spring loading means including:-
 - a drum housing a coil spring;
 - a spring adjuster which defines a grip means and an integral tube means which extends into the drum and to which a innermost end of the spring is fixed, an internal flange being defined in the tube, one side of which flange defines a series of sprag type clutch teeth; and
 - a post inserted inside the bore of the tube, the post defining a series of spray type clutch teeth adapted to mate with the clutch teeth of the flange,

wherein the post is secured to a side wall of the cage and the drum is anchored to the cash box by a cable and pulley system whereby tension in the cable can be adjusted by means of turning the spring adjuster, whereby when the cash box is pushed into the main cage, the drum rotates relative to the post and energy is stored in the spring which can be used to automatically raise the cash box when desired.

5. A game machine as claimed in claim 3 wherein the cash box is mounted on telescoping rails.

10. A gaming machine as claimed in claim 3 or claim 4 wherein the cage has walls and a base and a moveable lid assembly to allow the cage containing the cash box to move upwards out of the main cage.

15. A gaming machine as claimed in claim 5 wherein rollers project from the base of the lid assembly which are received in curved slots defined in the walls of the main cage to allow the lid assembly to slide backwards and forwards guided by the slots so that when the cage is opened and the lid is pushed backwards, the cash box may rise upwards and out from the main cage.

20. A spring loading device as claimed in claim 1 or claim 2 and substantially as hereinbefore described with reference to Figures 1 to 4 of the drawings.

8. A gaming machine substantially as hereinbefore described with reference to Figure 1 or Figures 5 to 8 of the drawings.

Dated this third day of November 1998

Aristocrat Technologies Australia Pty Limited

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~~PTY LTD~~

Patent Attorneys for the Applicant:

F.B. RICE & CO.



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FIG. 1A

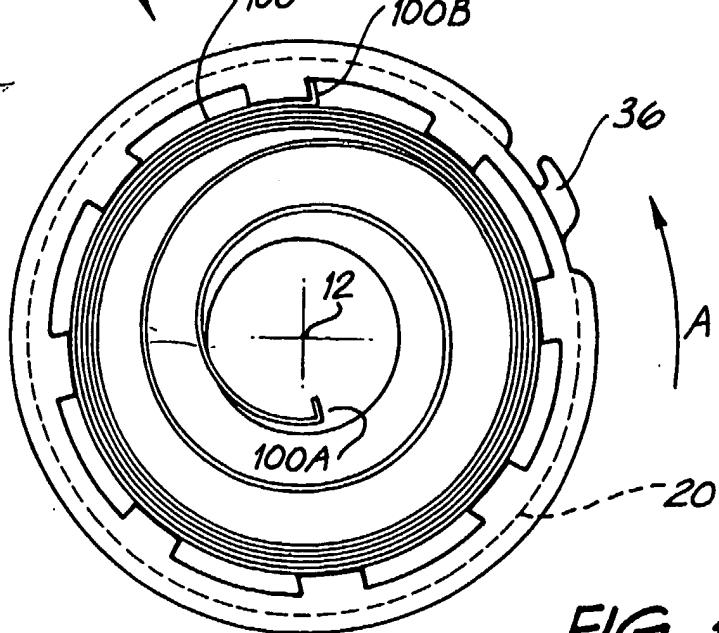
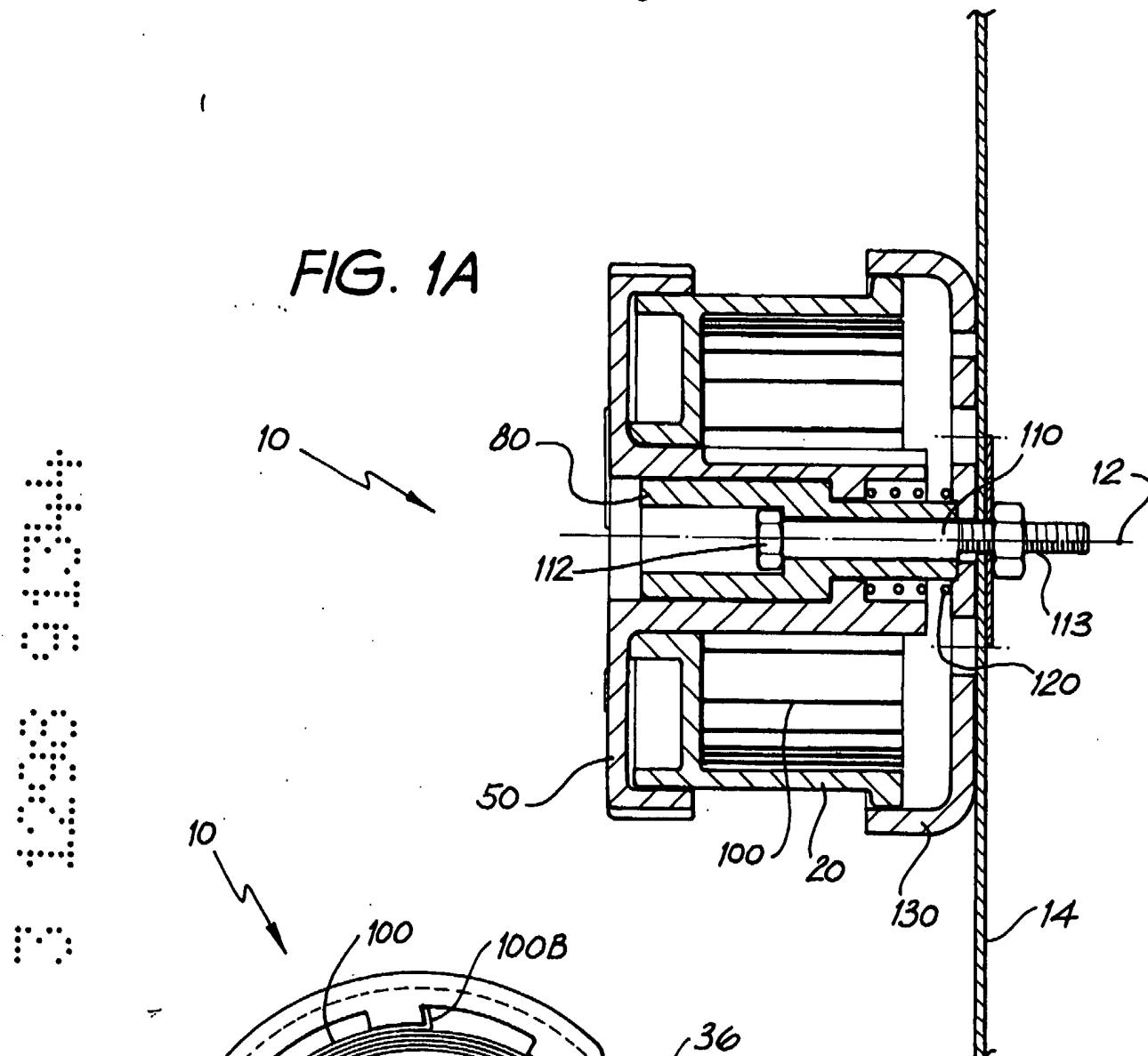
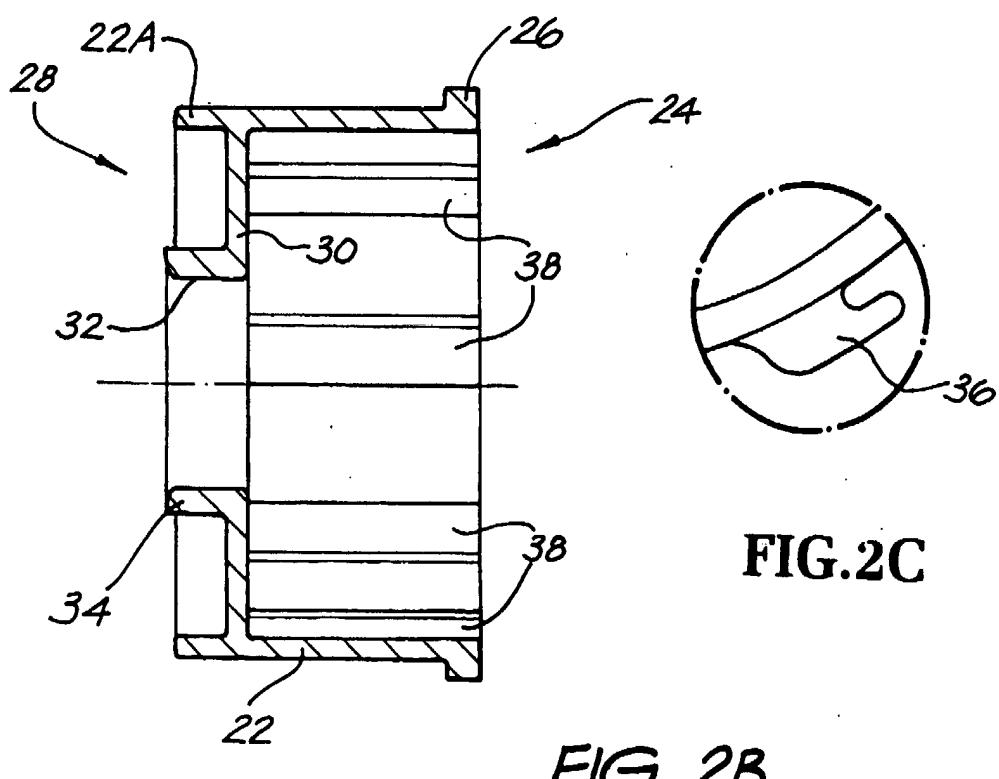
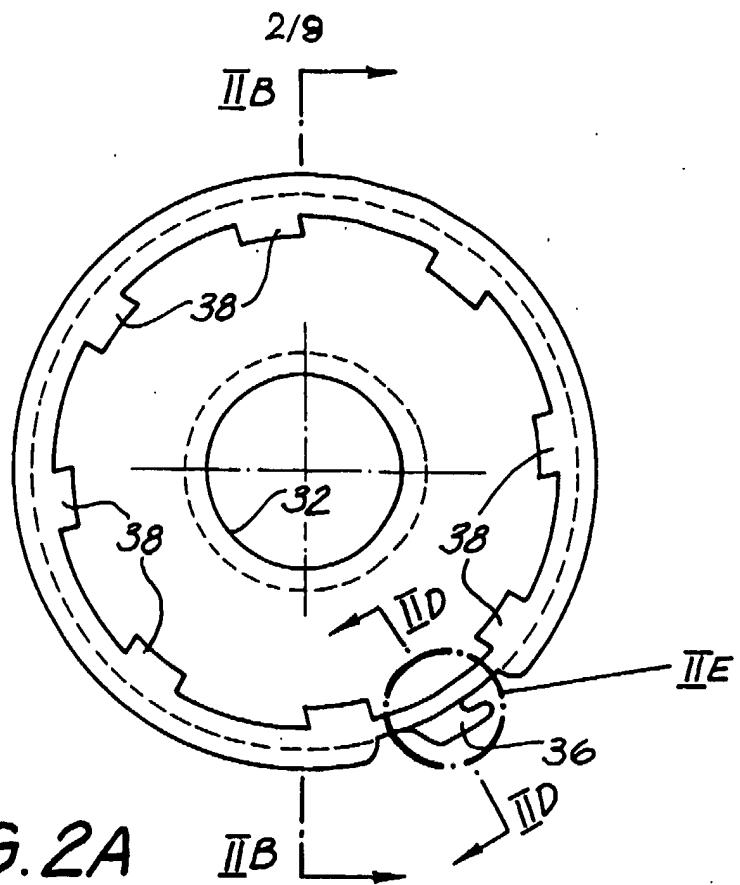


FIG. 1B



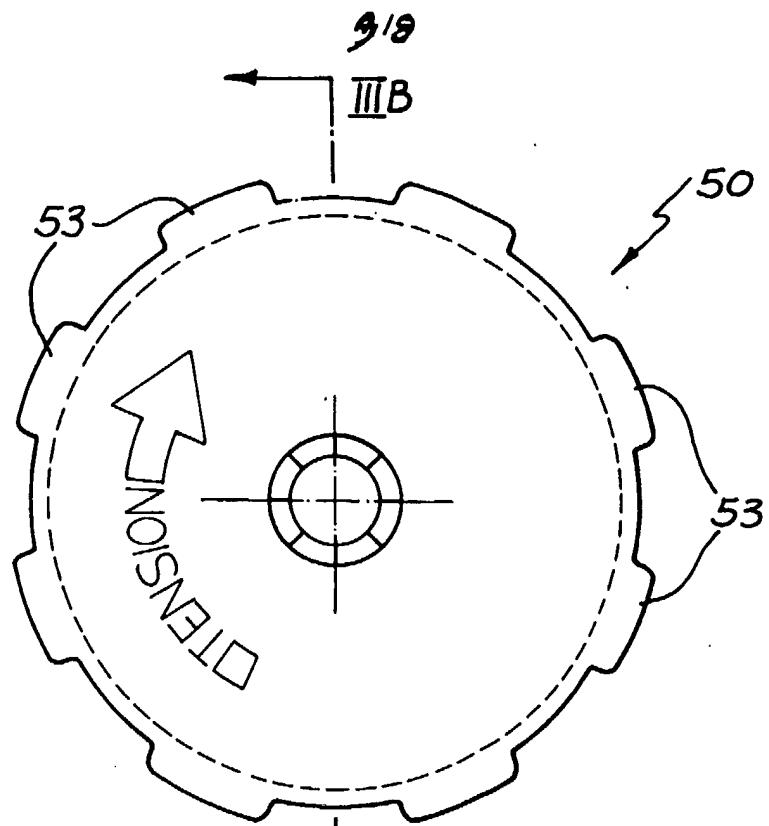


FIG. 3A

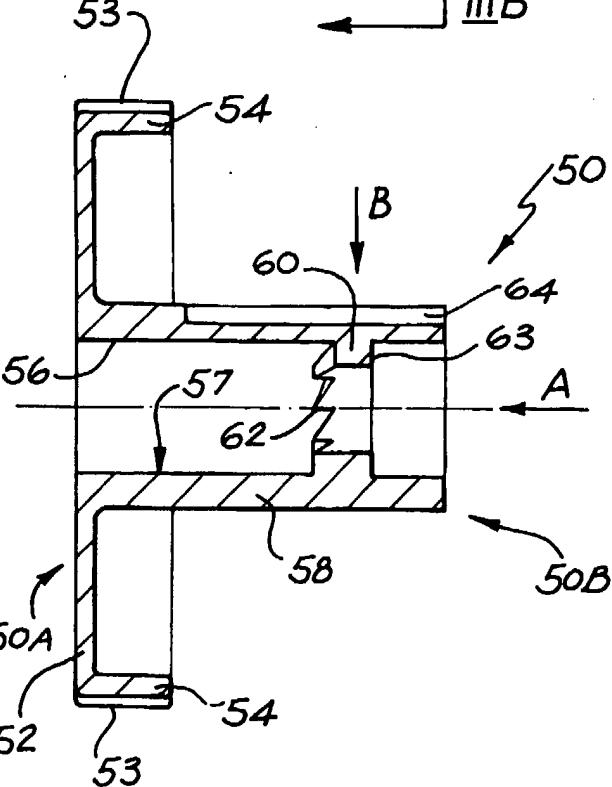


FIG. 3B

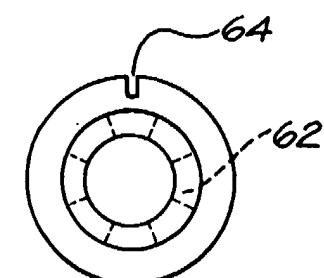


FIG. 3C

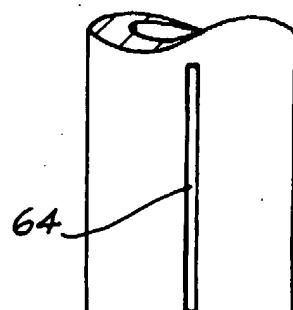


FIG. 3D

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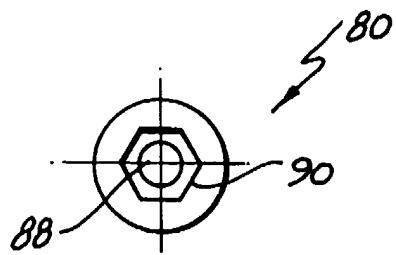


FIG. 4A

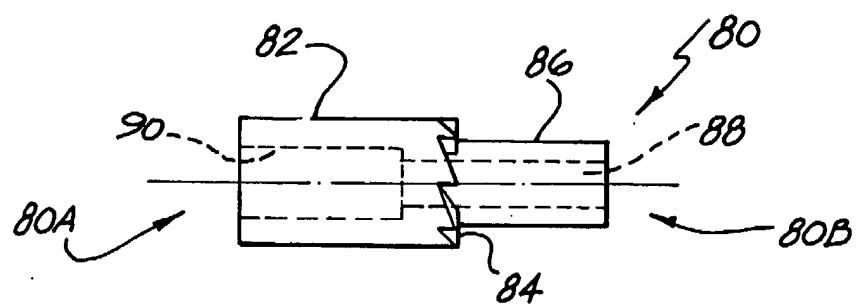


FIG. 4B

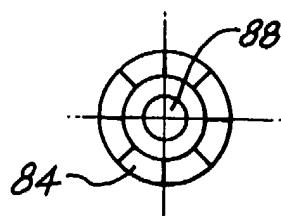
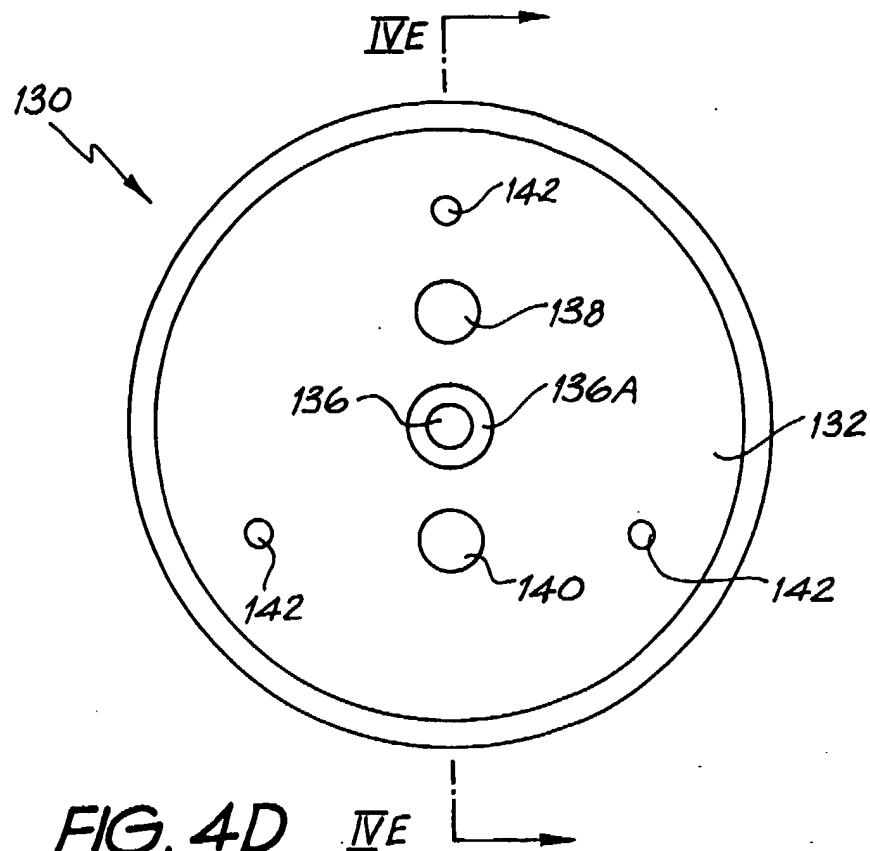
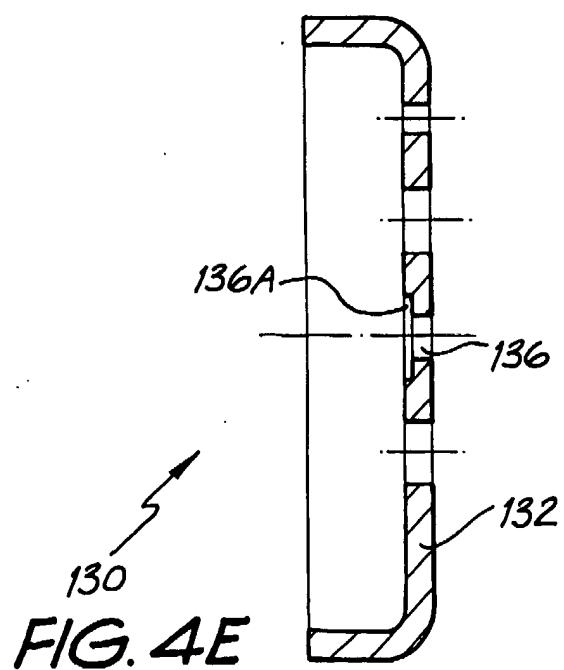


FIG. 4C

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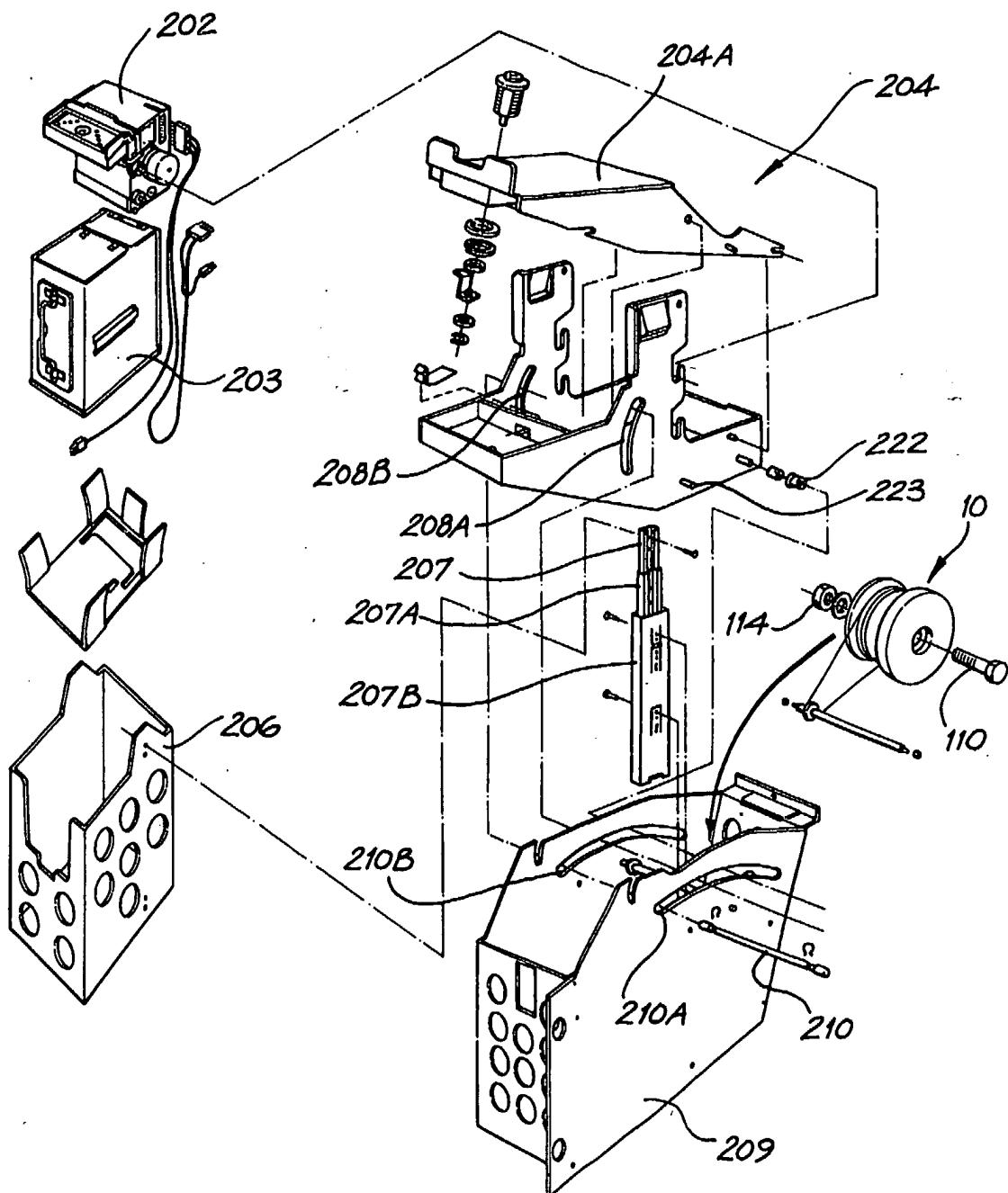


FIG. 5

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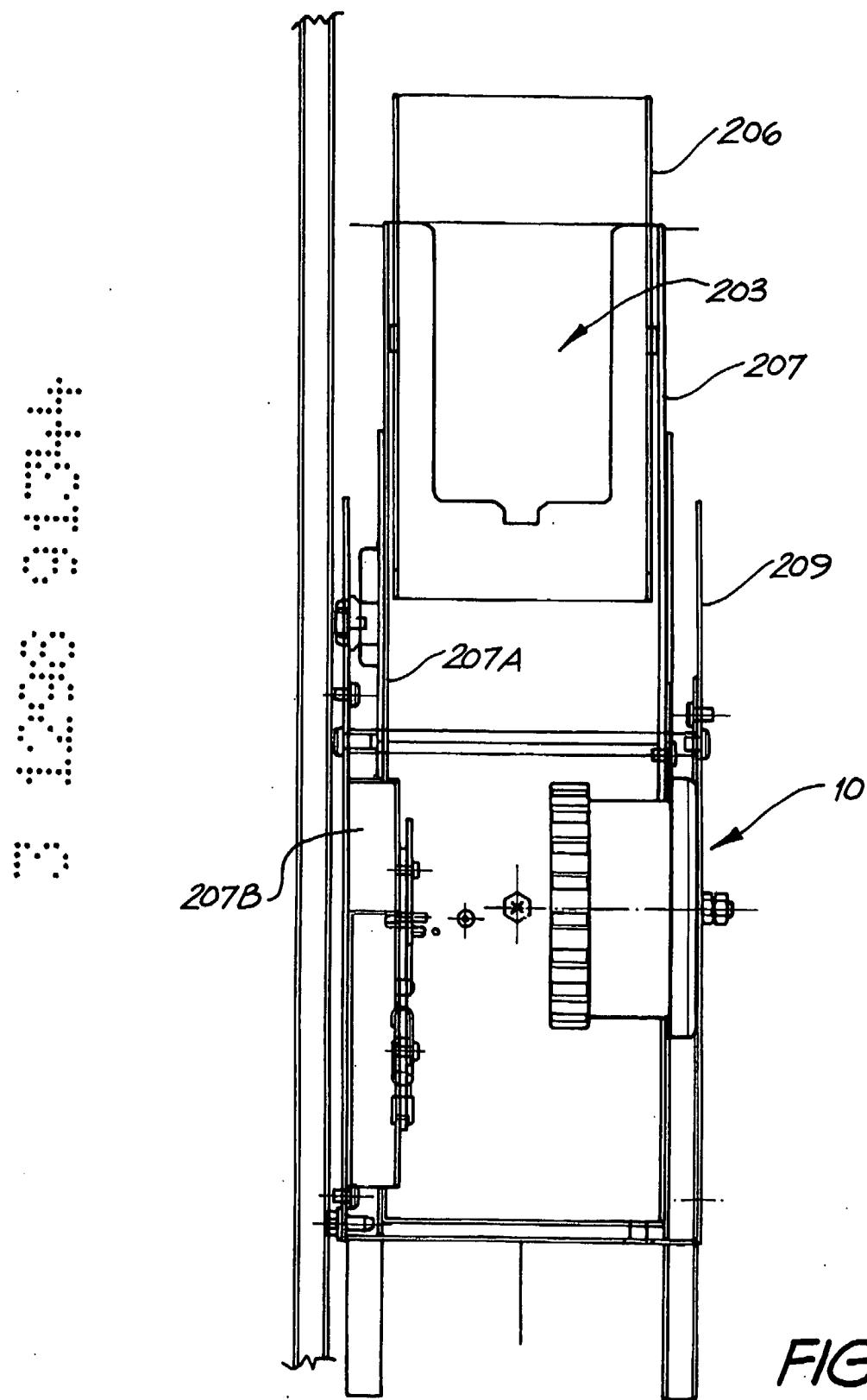
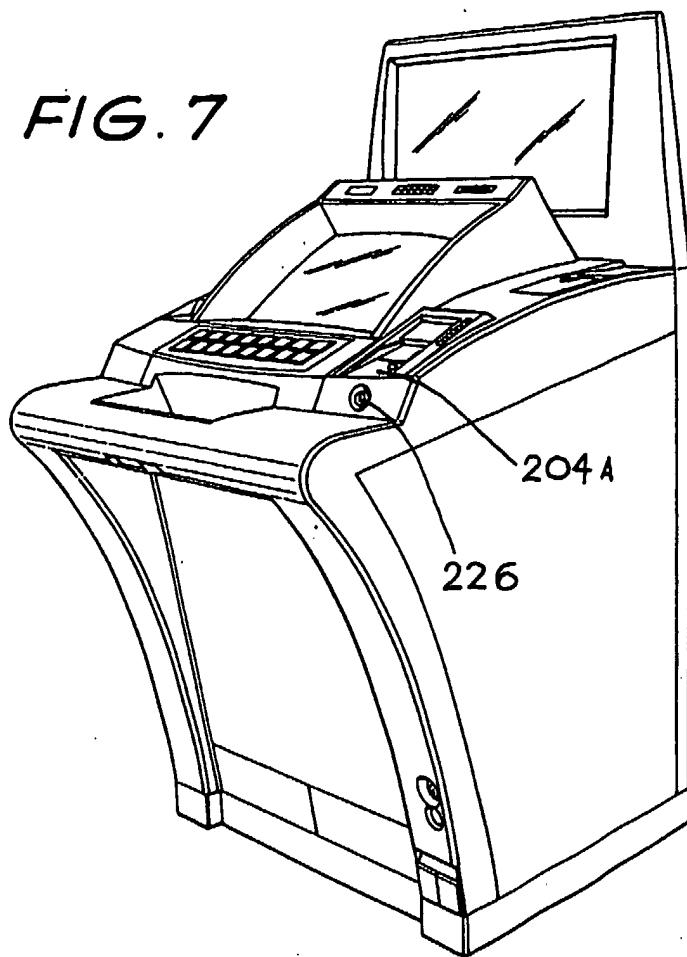


FIG. 6

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FIG. 7



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